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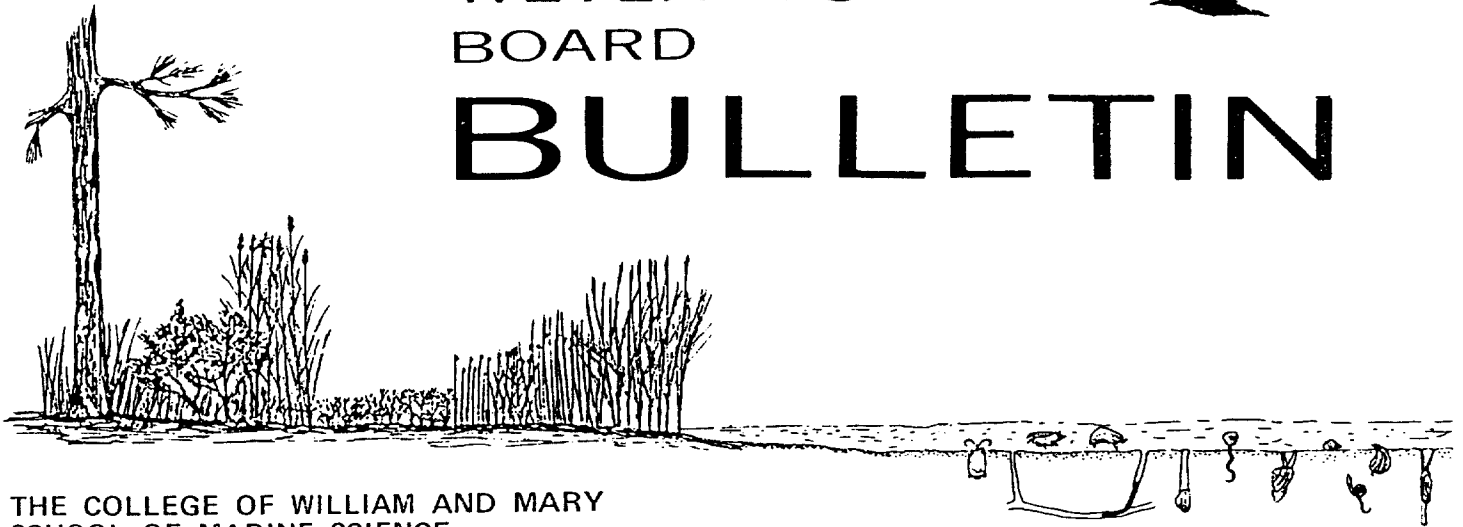
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WETLANDS BOARD

BULLETIN



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MARINA SITINGS FROM THE SCIENTIFIC ADVISOR'S VIEWPOINT

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ABSTRACT

The institutional framework of regulatory agencies involved with management of marina development is multi-layered and, at the local level, variable. The variety of agency purviews are not seen to be well coordinated so as to ensure consistent thorough reviews of all development plans. An absence of comprehensive information for impact assessment further complicates the process. Since the information deficit is not amenable to solution, better interagency coordination and establishment of long range management objectives are proposed as ameliorative steps toward resolution of the existing management dilemma.

INTRODUCTION

Shoreline development projects frequently raise a wide variety of concerns which run the gamut from environmental to economic. In the Commonwealth of Virginia, review, assessment and regulation of proposed projects can involve a diverse and variable group of special interest groups, advisory groups and regulatory agencies. One type of project which routinely involves almost all the concerns and groups is marina development. As such, these projects provide interesting case studies of the current efforts in Virginia to manage shoreline development and the estuarine resources of the Commonwealth.

Management of marina development places a premium on establishment of long range management objectives and short term impact assessments. This is a result of the large number of regulatory agencies involved and

the conflict marina development presents between development and preservation goals. It is the purpose of this paper to: 1) briefly review the institutional framework and impact assessment related to management of marina development, and 2) assess their respective effects on the management process. The review of these topics is based on the author's personal experiences with the process. The intent is to highlight some of the problem areas and suggest some possible modifications.

INSTITUTIONAL FRAMEWORK

Regulation of marina development involves a diverse group of agencies arrayed over three levels of government (i.e. local, state and federal). These agencies operate from unique perspectives with overlapping, although not necessarily coordinated, purviews. The regulatory agencies are in turn, supported to varying degrees by a variety of advisory agencies. The multiplicity of involved parties occasionally results in very thorough reviews of proposals and occasionally results in disjunct, discordant reviews. The dichotomy seems to result from the lack of a protocol for coordination of all agency reviews.

At the local level, a proposal for marina development will be reviewed by the Wetlands Board, the building inspector, the local health department and the local zoning board, if one exists. The purview of the building inspector and local health department are relatively well defined and limited. The design of structures and upland site development are regulated by the building inspector. The health department regulates potable water supply and sewage disposal. The Wetlands Boards purview is less well defined. In its most narrow construction, it covers any activities in the intertidal zone, which is specifically defined based on the presence/absence of vegetation. Broader construction of the purview has allowed boards to consider and/or regulate development in either waterways or on land, which may impact the intertidal resources. The local zoning board possesses the most extensive purview in terms of area and activities. One difference between zoning boards and other local agencies is the clear charge to the zoning board to consider the appropriateness of individual projects based on surrounding land uses, either existing or planned. Typically, there is no coordination among local regulatory agencies as far as management objectives are concerned. Particularly in rural areas coordination which does occur is frequently serendipitous, in the form of individuals who serve in multiple roles.

At the state level, proposals for marina development can initiate reviews by the Virginia Marine Resources Commission (VMRC), the Health Department and its Bureau of Shellfish Sanitation, and the State Water Control Board (SWCB). The common aspect of the review conducted by each of these agencies is a concern for water quality and its impacts on marine/estuarine resources and/or human health. Coordination among these agencies at the level of individual projects exists in the form of timing of permit issuance but does not typically involve in depth consultations or concerted efforts to share information or expertise. The state agencies effectively operate independently, regulating development in an effort to achieve agency-specific objectives.

The opinions expressed in this paper are solely those of the author and in no way represent an official position of the Virginia Institute of Marine Science.

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At the federal level review and regulation of marina development is operationally vested in the United States Army Corps of Engineers (Corps). The Corps is supported in its review by advice from the Environmental Protection Agency, National Marine Fisheries Service and the U.S. Fish and Wildlife Service. The Corps review focuses on environmental effects and navigation considerations. Within these areas of concern its purview effectively overlaps that of both the local and state agencies (especially wetlands boards and the VMRC). In Virginia there is a formal procedure for coordination of project reviews by the federal agencies and the state agencies involved. The process is limited, however, to case-by-case sharing of information and does not extend to thorough coordination of federal and state management objectives. Local agencies do not typically participate in the federal/state review or coordination.

IMPACT ASSESSMENT

The potential impacts associated with marina development can be broadly categorized as economic, social or ecological. This classification is arbitrary and only for purposes of this paper. The importance attached to these different types of potential impacts is variable, dependent on both the setting and local interests. Not all potential impacts are reviewed for each proposed project. Again, local interests generally influence the scope of the assessment.

Each type of potential impact encompasses a number of specific items. Assessments of the extent of impact are generally proffered by a number of interested parties and can be either quantitative or qualitative in nature. Table 1 summarizes the types of potential impacts, the sources of assessments usually relied upon and the type of assessment. The general types and their relative importance are reviewed below. (For more detailed treatment refer to the Coastal Marina Assessment Handbook prepared by the U.S. Environmental Protection Agency, 1985.)

Economic Impacts

Economic impacts are generally amenable to quantification, although in cases of cash flow the assessments are usually educated estimates. Typically economic impacts assume their greatest importance in management decisions when either the local government is interested in promoting economic development or adjacent property owners are concerned about diminished property values. In the absence of these interests, economic impacts do not typically receive overt considerations.

Social Impacts

Adjacent property owners and local interest groups usually ensure social impacts are at least aired in the resource management forum. With few exceptions, assessment of social impacts is not amenable to quantification. Regulatory agencies at all levels typically receive at least some information on social impacts but none of them possess a formal protocol for evaluating these impacts and weighing them against other considerations. The author's personal experience indicates that social impacts are of greatest importance at local and state levels. Both the local wetlands board and the VMRC conduct public hearings at which evaluation of social impacts (generally offered by those affected) constitute a significant part of the testimony received for consideration. The role these evaluations play in the final decisions can be highly variable, but (due to the absence of formal protocols for weighing) not amenable to quantification. (See Davos, 1977 and Dee et al., 1973 for treatment of weighing in management decision processes.)

Ecological Impacts

In general, ecological impacts are the focus of most of the deliberation and decision rationale in regulation of marina development. Indeed, the author's personal observation has been that parties with essentially economic or social concerns for a proposed project will frequently attempt to portray those concerns in an ecological format in order to achieve the greatest impact on regulatory agencies. If anything, this places a premium on the development of accurate assessments of potential environmental impacts. Unfortunately, in most cases, such assessments remain beyond the abilities of scientific advisors. The body of quantitative information currently available for assessment of marina impacts simply does not permit either site specific or general evaluation of potential impacts. (See Brandsma et al., 1973 and Nixon et al., 1973 as examples of the detailed studies necessary for impact assessment.)

For purposes of discussion, ecological impacts can be divided between direct impacts and secondary impacts. Direct impacts are those resulting from the physical construction of the project. Secondary impacts are those resulting from the operation or use of the facility. From the perspective of a scientific advisor, appreciation of the distinction between these two types of impacts is essential. When giving an *a priori* evaluation of ecological impacts it is much easier to speak with certainty about direct impacts than it is to imply certitude about secondary impacts.

Data which might support predictions of secondary impacts associated with marina development simply do not exist (see Raytheon Co., 1978 for review). Among researchers addressing the question, the current consensus seems to be that: 1) evaluations must be site specific, and 2) the necessary correlations between the physical parameters of a site and potential ecological impacts (particularly water quality) simply do not exist. Indeed, such correlations may never be sufficiently refined to support site specific management decisions regarding secondary impacts due to the inherent uncertainty associated with human behavior. It will be difficult enough to understand the relationships between local bays, estuary, current patterns and pollutant transport mechanisms for prediction of potential zones of pollution impact, without also having to assess the probability an individual boat owner will choose to bypass his marine sanitation device or spill a can of gasoline.

(cont. p.3)

Special Edition

Westmoreland County

Westmoreland County is blessed with miles of beautiful shoreline and relatively unpolluted waterways, as well as an abundance of fish, shellfish, crabs and waterfowl. This abundance is due in no small part to a still largely undisturbed but irreplaceable resource, its tidal marshes. These marshes reduce pollutants, serve as natural habitats for wildlife and fish and support, through their interactions with the tidal waters, much of what makes Westmoreland waterways clean and productive. Rapid and unplanned growth as well as shortsighted waterfront property owners and developers, a constant threat to the continued vitality of this resource. Only through careful planning and strict controls can needless destruction of these marshlands be avoided.

There are approximately 2,600 acres of tidal marshes found in Westmoreland County. Of those, the majority (1,849 acres) occur along the Potomac side of the County. The remaining 750 acres are found along the Rappahannock. Generally, brackish and saltwater marshes characterize the Potomac shoreline where the salinity is much higher than compared to the upper reaches of the Rappahannock River which harbors only tidal freshwater marshes.

LETTERS TO THE EDITOR

How much plant material does a marsh produce?

Salt marshes produce an average of four tons of organic material per acre in a year and as much as 10 tons per acre per year. By comparison an average yield of wheat is about two tons per acre per year. None of the common agriculture crops, except possibly rice and sugar cane production, come close to producing as much potential animal food as do the salt marshes.

Although much of the organic material produced on the marsh stays there, 25 to 40% may be exported through tidal action, growth by consumers or other mechanisms of translocation. The marshes are thus the primary producer for the detritus food web of the estuary.

What are some of the values of nonvegetated wetlands?

Nonvegetated wetlands are very important areas for wading birds, shorebirds and other migratory waterfowl. They are heavily utilized by commercial and sport fishes for feeding and are important habitat for blue crabs.

Organisms such as razor clams, quahogs, clam worms, soft-shelled clams, lugworms, burrowing shrimp, sea squirts, barnacles, polychaetes, snails and many more inhabit these nonvegetated sand and mud flats and are a food source for predators. In a meter square of sand/mud flat one can expect to find between 5,300 to 8,300 organisms.

Probably the most important overall value of the tidal flats is that of mediating the breakdown of the plant material produced on the marshes and catalyzing the recycling and exchange of nutrients within the estuary. This function has both water-quality maintenance and habitat value implications.

This Issues Quote

Man, despite his scientific achievements, his artistic pretensions, and his great expectations, owes his existence to a six inch layer of top soil and the fact that it rains.

-anonymous

DISCUSSION

Given the multiplicity of regulatory agencies and the limitations of impact assessment associated with marina development, what are the consequences for the resource management process? In Virginia, the author's experience indicates at least two immediately apparent consequences. First, decision rationales are not notably consistent. Second decisions are rendered on a case-by-case basis. Inconsistency among decision rationales takes two forms. First, on a federal level, not all management decisions are supported by recorded

statements of rationale. This does not mean the decisions themselves are necessarily inconsistent, but it does frustrate attempts to document the decision process and develop an "agency profile" (a detailed understanding of agency procedures and objectives). Second, rationale statements when they do exist, are not typically complete in the sense of summarizing all factors considered and indicating how the considerations were balanced in reaching the management decision. Again, this frustrates analysis of the decision process and development of "agency profiles."

Failure to produce consistent decision rationales arises from several causes and cannot be blamed entirely on the individual management agencies. The lack of formal protocols for documenting rationales is something individual agencies could correct. However, effective utilization of any such protocol presupposes that: 1) agency management objectives are well defined and clearly understood; 2) the relative importance of the multiple considerations in marina development have been determined; and 3) the information to support rationale development is consistently available. The first two of these items might be effectively resolved (see McAllister, 1980 and Westman, 1985), but the third item, as indicated in the impact assessment section of this paper, is frequently beyond the control of resource managers.

The benefits of possessing an "agency profile" are several. First, a clear record of an agency's concerns, weighing of factors and decision protocol provides a basis for coordination among agencies. Second, documentation of past decisions generates an "institutional memory" which in turn facilitates consistency in the face of personnel turnover. Finally, clear understanding of management goals allows prior planning by developers, enabling them to avoid the expenses of proposing undesirable or unacceptable projects.

The second basic consequence of the current institutional framework and information supply for marina management has been the rendering of decisions on a case-by-case basis. On the surface this may seem desirable since it implies individual projects find approval or disapproval based solely on their merits. A further implication, however, is that efforts to manage natural resources on a regional scale (i.e. any scale larger than the individual project) are compromised. Since it is not possible to effectively evaluate the incremental impacts associated with one more marina or twenty additional slips on a given body of water, decision rationales based on cumulative impact assessment are typical. The necessity to render defensible decisions, frequently constrains managers to consider only the most certain consequences of marina development. The result is a frustration of a widely held philosophy of resource management which calls for conservation of a resource until the impacts associated with development are fully understood.

The benefits of resource management on a regional scale seem particularly pertinent in the case of marina development. Since it is not possible to know precisely when "enough is enough," managers are currently caught in the continuing dilemma of trying to balance the need for development with the need to preserve "natural" systems. With no relief from this quandary imminent, an approach which provides some accommodation for both objectives seems appropriate. At least two methods are possible. Both require establishment of management goals in advance of any individual regulatory decisions. One method is establishment of conservation or preservation zones from which some forms of development are excluded. The other method is to spread development out in an effort to minimize potential cumulative impacts (see Anne Arundel County, 1980 for example). In both approaches the resource is effectively "zoned" on a large spatial scale. The benefits include the enhanced probability of preserving "natural" characteristics of a system or parts of a system and provision of the opportunity for developers to operate within known guidelines.

CONCLUSION

Proposals for marina development have posed and will continue to pose difficult problems for resource managers in the Commonwealth of Virginia. The number and variety of regulatory agencies potentially involved in review of such proposals can make the process complicated and does not ensure consistently thorough or coordinated decisions. Additionally, the efforts of these agencies to perform their roles are confounded to varying degrees by a lack of comprehensive information on which to base decisions. The two basic consequences of these situations are inconsistent decision rationales and a restriction of reviews to case-by-case evaluations.

The effective management of marine/estuarine resources would seem to require a comprehensive overview of all facets of the managed system, encompassing economic, social and ecological considerations. Because the purview of the regulatory agencies are not uniformly comprehensive, effective coordination is essential for meaningful attainment of goals. This coordination is not evident at present. While some of the agencies do interact regularly, there is not obvious unification of efforts. Achievement of such coordination should not be impossible since, ostensibly, all the regulatory agencies share similar or related goals.

A step in the process of developing a consistent and thorough management effort would be documentation of decision rationales by each agency. This can form the basis for analysis of similarities and dissimilarities among agency objectives. In some cases it may also help better define those objectives. In turn, the availability of specific information on the decision process of each agency may provide an opportunity for reduction in duplication of reviews and a chance to ensure consistently thorough review of all proposals.

The efficacy of management of marina development on a case-by-case basis is questionable in view of the shortcomings of impact assessment. The current process of management provides at least the potential for piecemeal despoliation of the resource. Promulgation and implementation of a regional management plan may provide the opportunity for preservation of some benefits of undegraded systems and simultaneously aid developers in effective planning.

TABLE 1

Potential Impacts Associated with Marina Development

	Assessment	
	Type	Source*
<u>Economic Impacts</u>		
cash flow associated with construction	quantitative	L,D
cash flow associated with operation	quantitative	L,D
alteration in local tax base	quantitative	L
alteration of surrounding property values	quantitative	L
<u>Social Impacts</u>		
aesthetics	qualitative	I
alteration of neighborhood "character"	qualitative	I
alteration of waterway use patterns	qualitative	D,I
<u>Ecological Impacts</u>		
direct impacts		
destruction of intertidal wetlands	quantitative	D,A
destruction of subtidal bottoms	quantitative	D,A
disruption of subtidal benthic communities	qualitative	A
alteration of local water quality	qualitative	A
alteration of riparian lands	quantitative	D,A
secondary impacts		
alteration of water quality	qualitative	A
condemnation of local shellfish beds	quantitative	S
modification of circulation	qualitative	A
increase in wake induced erosion	qualitative	A

* L=local government
S=state agency
D=developer
I=interest group
A=scientific advisor

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